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RESEARCH AT THE PARSONS TIMBER AND WATERSHED LABORATORY

Forests cover almost three-fourths of the land area in West Virginia. Because of the roughness of the terrain, forest cover will continue as an important land use. The economy of the region depends heavily on the wood produced by the forests; with improved management this dependency should increase.

Much of the forest land has high wood production potential; at present this potential is not being realized. While much of the area will support a rich mixture of desirable species many of the stands are cluttered up with poor individual stems and inferior species. Moreover, because of fire and overcutting, many stands are understocked. According to the most recent Forest Survey of West Virginia (1964) only 14 percent of the commercial forest land is well-stocked with good species of high-quality stems.

The area is subject to increasing pressures for good water supplies and recreational use. The multiple use aspects of forest land emphasize the importance of working out management methods that are compatible with timber production in combination with other forest uses.

Research has been conducted at Parsons for almost 20 years and has had a strong and favorable impact on the timber economy of the State. During this period about 126 reports of research results have been published, supplying the forest-management people of West Virginia with information to help them up-grade their stands, to increase the profits in the wood industry, and to enhance water supplies.

The recent construction of a modern forest research laboratory at Parsons provided much-needed facilities for stepped-up research output. In 1966 ten papers were published and seven have been published already in 1967, with ten more at the publishers. The research staff currently has 42 studies underway, many of them on the Fernow Experimental Forest near Parsons.

The essence of profit in hardwood management is log quality. Much effort is being directed at Parsons into working out methods of growing trees with high-quality logs to supply the high-value wood needed by the furniture and veneer industries. A recent study has shown us, for example, that it is relatively simple to grow knot-free white ash but growing knot-free white oak requires rigorous measures.

In recent years, increasing emphasis has been placed by forest managers on even-aged systems of managing our hardwood forests. This means growing our timber in even-aged stands, as crops are grown, rather than in all-aged stands as has been more customary for many years. One of the advantages of this system is that it is more suitable for growing such high-value, fast-growing species as yellow-poplar and black cherry. With even-aged management early weeding operations are needed to produce good stands, but since this type of management is relatively new little is known about the needed intensity, the best timing, and the costs of such operations. Considerable research effort is being spent at Parsons to provide the West Virginia forest managers with this information. Already our research has begun to pay off with publishable data on the type of forest reproduction that can be expected with even-aged management. We have learned that a clear-cut harvest operation in a mature stand on a good hardwood site is followed by an abundant stand of good young stems.

As the demand for forest products increases and as the geneticists develop better types of trees, the advantages of tree planting (or seeding) of better stock in our wooded areas increases. This includes the introduction of fast-growing pines into some poor hardwood growing land where the pines grow better than the hardwoods. We have learned that on such areas white pine is potentially a more profitable crop than oak. This research includes also studies of introducing better

hardwoods in many of our present hardwood stands and the planting to trees of many brushy fields. The cost of such work has been an obstacle to progress in the past and some of the current studies being made by the Parsons staff are directed toward developing less expensive and more satisfactory procedures for doing this work.

For many years in Europe, and more recently in the American South, some forest lands have been fertilized for improved tree growth. Recently there has been an interest in this type of work in this area. The improved lab facilities at Parsons have enabled the staff to embark on a forest fertilization research program designed to find out if forest land fertilization is feasible for the soils in mountainous West Virginia. This work is just getting started in a small way and meaningful results cannot be expected for some time.

The recent drought in the northeast has stimulated several reports summarizing research at the Fernow Experimental Forest to show that cutting trees can increase streamflow. Traditionally, forests are the guardians of our streams, a view that is as valid now as ever. Nevertheless, country-wide experience shows that cutting trees does increase streamflow. Experiments at the Fernow go a necessary step further, showing that cut trees can be harvested without harm to the water supply. However, Parsons scientists add

that certain safeguards must be observed if timber harvest is to increase streamflow without causing damaging floods or erosion. These safeguards are: (1) The road system must be carefully located away from streams and traffic regulated to minimize soil disturbance caused by modern logging machinery, and (2) The roads and cutover forest land must quickly be revegetated to forestall erosion. They hasten to add that timber harvest during a drought cannot increase streamflow. The cutting must be done when soils are wet. Then water which previously would have been drawn from the soil by trees is freed to move to streams through the soil.

A recent publication highlights that roads are the real culprit in most places where dirty streams accompany logging. It features an experiment now in progress where every tree was cut and all regrowth killed as soon as it appeared. Even though this "desert" has been maintained up to three years in some places, the streams draining this watershed continue to run clear. Inevitably severe erosion and flash flooding must develop but this watershed soon will be replanted to start another experiment. The important point is that the timber was harvested from a contour road system carefully located well clear of the streams. Even though this land is deliberately being abused, streams are undamaged because the road system and timber harvest were intelligently planned.

Several new studies will cast light on managing West Virginia forests to provide more and better water. A hillside is being instrumented to show Parsons scientists how much water moves through forest soil, the routes it follows, and its rates of movement. Strip mine excavations will be examined to see where forest tree roots grow. Even though conservation-minded people deplore strip mining, the highwalls do provide a unique opportunity for forest tree root observation. Lastly, the city of Princeton has asked Parsons scientists for estimates of reliable streamflow from their forested watershed. This information could help to attract industry. Possibly, judicious timber harvest on the Princeton watershed can appreciably increase the city's water supply.

PUBLICATIONS

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Parsons, West Virginia

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5. INCREASING WATER YIELD IN THE NORTHEAST BY MANAGEMENT OF FORESTED WATERSHEDS. By Howard W. Lull and Kenneth G. Reinhart. U. S. Forest Serv., Res. Paper NE-66, 45 pp., illus.

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7. CLEAR CUTTING AND THE EROSION HAZARD. By James Hornbeck. Northern Logger and Timber Processer. Oct. 1967, pp 14, 15, 38, 39, and 48. Illus.